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A New Subterranean Isopod from Kansas.

Cœcidotea tridentata (Crustacea).

By H. B. HUNGERFORD,
Professor of Entomology, University of Kansas.

IN MARCH of 1919, Mr. William Hoffmann, field assistant in our department of entomology at the University of Kansas, brought to me for determination some specimens of an isopod which he had taken from a cistern in Lawrence, Kan.

They prove to belong to a new species of the genus *Cœcidotea*. For them I propose the name *Cœcidotea tridentata*, because the propodus of the first pair of legs of the male is armed with three conspicuous processes, a character which separates them from the previously described species.

The crustacean genus *Cœcidotea* Pack., as the name implies, is characterized by the absence of eyes, by the fact that the terminal segment of the body is much longer than broad, and by the elongate, narrow body. An analytical key to the genus was given by Harriet Richardson in her monograph of the isopods of North America, in 1905. There were known at that time four species, namely, *C. stygia* Pack., *C. nickajackensis* Pack., C. *richardsonæ* Hay and *C. smithsii* Ulrich. Doctor Ortmann, 1918, in chapter XXV of "Fresh-water Biology," had Miss Richardson's work in mind when he said there were four species of the genus and that they are found in caves, springs issuing from caves, and artesian wells. However, in 1911, in the Pomona College *Journal of Entomology*, volume 3, No. 3, Blanche Stafford described a fifth species, namely, *Cœcidotea alabamensis*, from a well in Auburn, Ala.

The following table will serve to separate the six species of the genus now known:

A. Propodus of first pair of legs armed with one or more triangular processes.

B. Propodus of first pair of legs armed with a triangular process near the distal end and with a long spine at the proximal extremity. Uropods about one-half the length of terminal abdominal segment. Outer branch three-fourths as long as inner, which equals the peduncle in length. *C. nickajackensis* Pack.

BB. Propodus of first pair of legs armed with two triangular processes.

C. Propodus with three additional short processes. Uropods about as long as terminal abdominal segment. Outer branch two-thirds as long as inner, which is two-thirds as long as peduncle. *C. stygia* Pack.

CC. Propodus with three additional spines not processes. Uropods a little longer than terminal abdominal segment. Outer branch about one-half as long as inner, which is two-thirds as long as peduncle. *C. alabamensis* Stafford.

BBB. Propodus of first pair of legs armed with three triangular processes. *C. tridentata,* sp. nov.

AA. Propodus of first pair of legs not armed with triangular processes, but edged inside with spines.

B. First pair of antennæ, with flagellum composed of eleven articles, extend one-third the length of the fifth article of the peduncle of the second antenna. Second antenna longer than the body; flagellum composed of about eighty-six articles. *C. richardsonæ* Hay.

BB. First pair of antennæ, with flagellum composed of five articles, extend half the length of the peduncle of the second antenna. Second pair of antennæ "probably as long as body," flagellum composed of "at least forty segments." *C. smithsii* Ulrich.

Cœcidotea tridentata sp. nov.

(Plate XV.)

Size. The body without the antennæ and uropoda measures in length from 9 mm. to 19 mm. and in width from 1¾ mm. to 3 mm. The length of the body is approximately five or six times the width. This species is much larger than the others of this genus that have been described. From the descriptions I infer that 10 mm. is about the maximum of *C. stygia* Packard, the largest member of the genus, while 3 mm. is supposed to be the maximum of *C. smithsii* Ulrich, the smallest. These figures suggest that the smallest mature *C. tridentata* are about the size of some of the members of other species, but the largest individuals are fully double that size.

Color. The color is chalky white, the body wall being sufficiently clear to show the dark food canal within. Material stored in alcohol appears very pale yellowish gray.

Structure. Head: Narrower than first thoracic segment. Wider than long. The cephalic margin narrower than the caudal, somewhat concave, and bearing the antennules and antennæ, the bases of the latter appearing very heavy when compared with the size of the head. The antennule consists of the basal segments and a flagellum of from twelve to eighteen segments, the two parts of about equal length; the basal segment stoutest, a trifle longer than twice its width; second segment two-thirds as broad as basal and about same length; third segment much smaller; five-eighths as broad and one-half as long as second. Its distal end bears the tapering flagellum. The an-

tennæ are relatively large and consist of a basal part of six segments and a flagellum of from sixty to eighty segments. Each of the first four segments of the basal part is broader than long. Taken together they are equal in length to the fifth segment, which is a little shorter than the sixth, from which arises the many-segmented flagellum. The mandible bears a large three-segmented flattened palp and two chitin-tipped processes, one a chisel-like cutting edge and the other bearing from four to seven teeth.

Thorax: The segments of the thorax are loosely articulated and their lateral margins are fringed with very short, stout setæ. All are broader than long. It bears seven pairs of legs, of which the first pair is subchelate.

The first pair of legs is shorter than the others. In the males the propodus is very large and bears three well-developed processes, one at the base and two near the distal end. The basal one is bifurcate in some and in others bears instead a strong seta. There are seven divisions to each limb, counting the clawlike terminal one. The propodus is the enlarged fifth division by this count. The limbs bear many strong setæ and increase in length from the first to the last.

Abdomen: The first two segments of the abdomen are short. The so-called third is nearly twice as long as wide and carries the uropods, each of which consists of a basal part and two terminal branches. The uropods are longer than the abdominal segment which bears them, the relative length being 5:3. The basal segment is nearly as long as the last abdominal segment, the ratio about 6:7 in the males. The two branches are of very unequal length; the one female possessing uropods had this basal segment 1:3, the inner being much the larger. The relative lengths vary from 3:2 in the female to 4:1 in the male. The inner branch is to the peduncle as 3:4. There is considerable variation in the comparative lengths of these parts. The second pleopod of the male, the first of the female and the third pleopods of both sexes are unlike those figured by Stafford for *C. alabamensis.*

Holotype, allotype and paratypes in alcohol. Kansas University collection.

The females are smaller than the males and do not have as well-developed propodi. The sexual dimorphism appears not to have been recorded in the genus heretofore. Another point not mentioned in descriptions is the fact that the females possess the flattened brood pouches or oöstegites at the base of the first four pairs of legs. Our specimens were obtained in June, and some of the females bear these plates.

I asked Mr. Hoffmann, who gathered the material, to submit a few notes relating the circumstances of their collection. His notes in substance follow:

The cistern from which these specimens were taken is about eight feet in diameter and nine feet deep. It contains a square brick filter, resting on the bottom in the center, which measures three or four feet square at base and tapers to its top, some four feet above, where it is just large enough for a four-inch casing, which extends

above to within three feet of the top. This casing surrounds the pipe leading to the pump, and is open at the top. The water supplying the cistern is caught upon the roof of the house and conducted to the cistern by galvanized pipes three or four inches in diameter.

On one occasion during a rain two isopods were observed by the lady of the house to be washed out of the elbow pipe leading from the gutter along the eaves of the house onto the sloping tin roof of the kitchen, thence into another gutter and down the pipe to the cistern. She concluded, therefore, that these animals, which she pumped up by way of the pitcher pump in the kitchen sink, were either "rained or had bred in the collection of wet leaves in the gutters of the house or in the elbow of the pipe leading from them."

A number of specimens were taken alive in the water pumped from the cistern. One of these was placed in a specimen jar, three and one-half inches in diameter and three inches deep, where it lived in one and one-half inches of water from June 18 until July 26. The water was replenished from time to time with dirty pond water, containing many small organisms.

Most of the specimens died within a few days. When several were placed together they seemed to take no notice of each other. The pleopods were observed to be in vibration as an individual made its way through the water.

It is unfortunate that we were too busy to run any behavior experiments upon these most interesting forms.

NOTE.—Through the kindness of the custodian of Crustacea I had the privilege of examining the *Cœcidotea* material in the National Museum at Washington, D. C. One jar marked *Cœcidotea stygia* contains eight vials; four of these contain large specimens which belong to the species I have described as new. It is interesting to note that they were collected at Topeka, Kan. They bear labels as follows: "Gift of E. A. Popenoe, Topeka, Kansas," and were taken "April 9, May 4, May 12, May 29, 1912." The other four vials contain material taken from "Graham's Spring, Lexington, Va., 1876"; Richardson's Spring, Ky., W. P. Hay, Col."; "Irvington, Ind., from wells W. P. Hay"; "Mammoth Cave, Ky., R. E. Call."

The last four lots are much smaller specimens than the Kansas material. The material from Virginia, Richardson's Spring, Ky., and from Indiana, differs materially from the Kansas species. The species is broader than the Kansas crustacean, and the third pleopods are not only much broader comparatively, but are more truncate at the tip.

PLATE XV.

Cœcidotea tridentata (Crustacea).

FIG. 1. First pleopod of female.
FIG. 2. First antenna.
FIG. 3. Mandible.
FIG. 4. First pair pleopods of male.
FIG. 5. Leg of female bearing oöstegite.
FIG. 6. Second pair pleopods of male.
FIG. 7. Front leg of male.
FIG. 8. Adult male.
FIG. 9. Third pleopod of male.
FIG. 10. Front leg of female.
FIG. 11. Mature female carrying brood pouch.
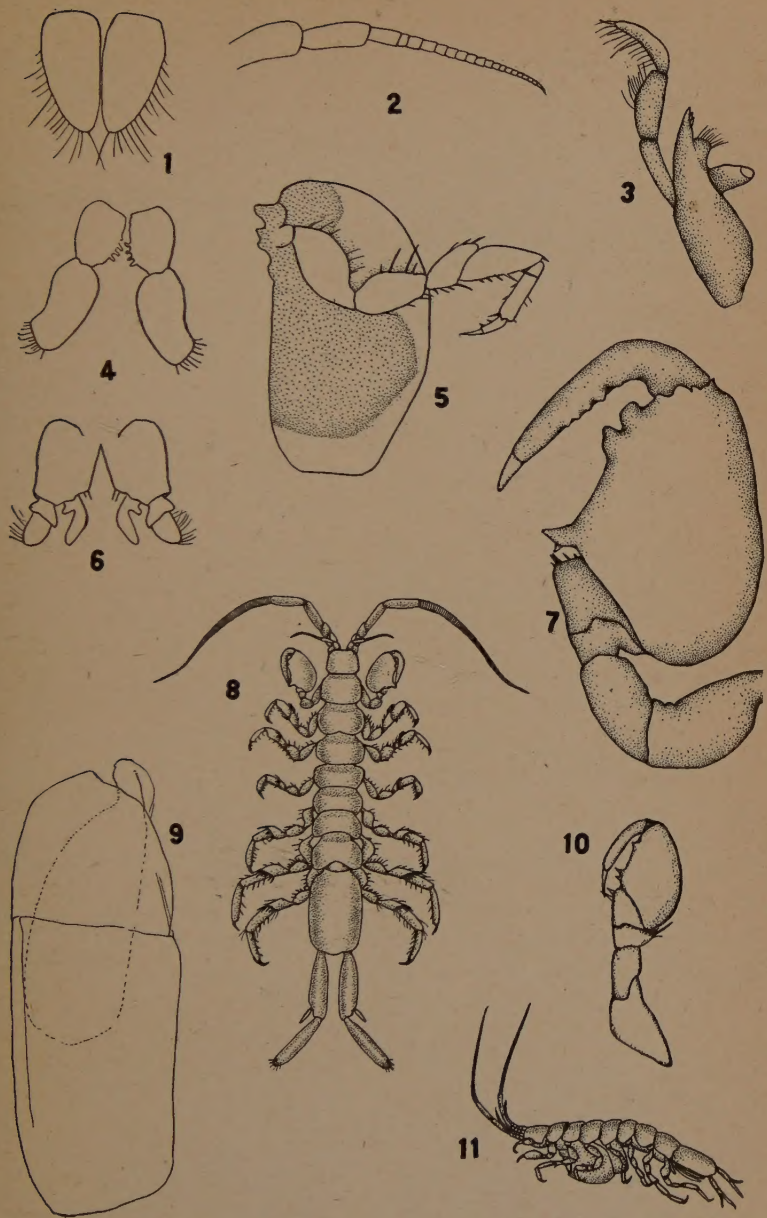
PLATE XV.